
आम का गूदा / प्यूरी — विशिष्टि
(दूसरा पुनरीक्षण)

Mango Pulp/Puree — Specification
(Second Revision)

ICS 67.080.01

© BIS 2019



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Fruits, Vegetables and Allied Products Sectional Committee had been approved by the Food and Agriculture Division Council.

Mango pulp and puree occupies an important place among the fruit pulp and juices manufactured in India. There is good scope for the development of external as well as internal trade for this product. To ensure the quality of the products and build up an increasing demand for it, it is necessary to have strict quality control based on specifications.

The standard was originally published in 1966 and subsequently revised in 1976 in the light of latest technological development in this field. In the first revision, provisions for hygienic conditions were incorporated and requirements for vacuum, degrees brix, acidity and limits for metals were modified. Requirement for pH was deleted and total ash was replaced by acid insoluble ash. Details about packing were also included in the revision. The first revision was amended in May 1996 to introduce scheme for labelling environment friendly products to be known as ECO-Mark at the instance of the Ministry of Environment and Forests (MoEF).

The second revision of this standard is being carried out to harmonize the standard with *Food Safety and Standards Act*, 2006 and Regulations framed thereunder. In this revision the following major changes have been made:

- a) The limits of heavy metal contaminants has been modified as per *Food Safety and Standards (Contaminants, Toxins and Residues) Regulations*, 2011;
- b) The standard's title and scope has been modified to include mango puree along with mango pulp and the word canned has been deleted as it limits the type of packaging that can be used for the product;
- c) The Marking clause has been modified to take into cognizance the *Legal Metrology (Packaged Commodities) Rules*, 2011; and
- d) The microbiological requirements have been modified as per *Food Safety and Standards (Contaminants, Toxins and Residues) Regulations*, 2011.

In the formulation of this standard, due consideration has been given to the provisions of the *Food Safety and Standards Act*, 2006 and the *Rules and Regulations* framed thereunder and the *Legal Metrology (Packaged Commodities) Rules*, 2011. However, this standard is subject to the restrictions imposed under these, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

MANGO PULP/PUREE — SPECIFICATION

(Second Revision)

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for mango pulp/puree.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title
2860 : 1964	Methods of sampling and test for processed fruits and vegetables
3547 : 1976	Specification for mango nectar (<i>first revision</i>)
5887 (Part 3) : 1999	Methods for detection of bacteria responsible for food poisoning: Part 3 General guidance on methods for the detection of <i>Salmonella</i> (<i>second revision</i>)
5887 (Part 5) : 1976	Methods for detection of bacteria responsible for food poisoning: Part 5 Isolation, identification and enumeration of <i>Vibrio cholerae</i> and <i>Vibrio parahaemolyticus</i> (<i>first revision</i>)
6542 : 1972	Code for hygienic conditions for fruit and vegetable canning units
13815 : 2009/ ISO 2173 : 2003	Fruit and vegetable products — Determination of soluble solids content — Refractometric method (<i>first revision</i>)
13846 : 2009/ ISO 763 : 2003	Fruit and vegetable products — Determination of ash insoluble in hydrochloric acid (<i>first revision</i>)
14397 : 1996	Methods for detection, isolation and identification of pathogenic <i>E. coli</i> in foods
14988 (Part 1) : 2001	Microbiology of food and feeding stuffs — Horizontal method for detection and enumeration of <i>Listeria monocytogenes</i> : Part 1 Detection method

IS No.

Title

15096 : 2002	Fruit and vegetable products — Determination of ethanol content
ISO 15213 : 2003	Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of sulfite-reducing bacteria growing under anaerobic conditions

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Head Space — The distance between the top of the double seam and the level of the surface of the contents.

3.2 Absence of Defects — Freedom from extraneous materials, such as peel and fibrous tissue.

4 GRADES

Mango pulp/puree shall be of two grades, namely, Grade 1 and Grade 2 (*see also 5.6.1 and Annex A*).

5 REQUIREMENTS

5.1 General

5.1.1 Mango pulp/puree and sweetened mango pulp/puree means unfermented but fermentable product intended for direct consumption, obtained from edible portion of sound, ripe mangoes (*Mangifera indica L.*), by sieving the prepared fruits, whereas, the puree is obtained by finely dividing the pulp by a finisher or other mechanical means and processed by heat in an appropriate manner, before or after being sealed in a container, so as to prevent spoilage.

5.1.2 It may contain one or more nutritive sweeteners in amounts not exceeding 50 gm/kg. However, the product shall be described as sweetened mango pulp/puree if the amount of nutritive sweeteners in excess of 15 gm/kg. The products when packed in natural form shall contain minimum 95 percent mango pulp/puree. However, sweetened pulp/puree shall contain minimum 85 percent mango pulp/puree.

5.2 Colouring Matter, Flavouring and Synthetic-Sweetening Agents

The product shall be free from artificial colouring matter, flavouring and synthetic-sweetening agents.

5.3 Total Sugars

The total sugars (expressed as sucrose) in the mango pulp/puree shall be not less than 14 percent by mass when tested according to the method prescribed in Annex B of IS 3547.

5.4 Ethanol Content

The ethanol content of mango pulp/puree shall not exceed 3 g/kg when tested according to the method given in the IS 15096.

5.5 Mango Pulp/Puree

5.5.1 Organoleptic Requirements

The requirements for the two grades of mango pulp/puree shall be as given below:

- Grade 1 — Mango pulp/puree shall possess a good body, uniform colour, good consistency, normal characteristic taste and flavour and practically free from defects. It shall score not less than 85 points.
- Grade 2 — Mango pulp/puree shall possess a good body, reasonably uniform colour, reasonably good consistency, normal characteristic taste and flavour and reasonably free from defects. It shall score not less than 75 points.

The maximum and minimum number of points to be scored by different factors shall be as below:

Factor		MAXIMUM MINIMUM	
		Grade 1	Grade 2
Colour	20	15	13
Consistency	20	15	13
Taste and flavour	40	30	26
Absence of defects	20	15	13

5.5.1.1 Scoring shall be done according to the method prescribed in Annex A.

5.6 Hygienic Requirements

The material shall be prepared and handled under strict hygienic conditions (*see* IS 6542) by persons free from contagious and infectious diseases. The premises shall be maintained in a thoroughly clean and hygienic condition and shall have adequate and safe water supply. All workers shall wear clean, white, washed clothing. Necessary precautions shall be taken to prevent incidental contamination of the product from soiled equipment or from personnel suffering from injuries.

5.6.1 All equipment coming in contact with raw materials or products in the course of manufacture shall be kept clean. An ample supply of steam and water, hose, brushes and other equipment necessary for proper cleaning of machinery and equipment shall be available. The equipment shall be properly cleaned with suitable chlorine solution having 50 mg/kg available chlorine.

5.7 Other Requirements

Canned mango pulp/puree shall also conform to the requirements prescribed in Table 1.

5.7.1 The product shall not contain metallic contaminants in excess of quantities specified in Table 2.

5.7.2 The product shall conform to the microbiological requirements prescribed in Table 3.

5.7.3 Minimum Fill

The container shall be well filled with the product and shall occupy not less than 90.0 percent of the water capacity of the container when tested in accordance with the method prescribed in Annex C, when packed in the rigid containers. The water capacity of the container is the volume of distilled water at 20°C

Table 1 Requirements for Mango Pulp/Puree
(Clause 5.7 and 8)

SI No.	Characteristic	Requirement	Method of Rest, Ref to Clause No.
(1)	(2)	(3)	(4)
(i)	Vacuum of the can in mm, <i>Min</i> (if product is canned)	150	5 of IS 2860
(ii)	Head space of the can in mm, <i>Max</i> (if product is canned)	16	6 of IS 2860
(iii)	Total soluble solids (m/m), <i>Min</i> a) Sweetened b) Unsweetened	15.0 12.0	13815
(iv)	Acidity (m/m) percent, expressed as anhydrous citric acid (for sweetened canned mango pulp), <i>Min</i>	0.3	10 of IS 2860
(v)	Acid insoluble ash, percent by weight, <i>Max</i>	0.5	13846
(vi)	Microbiological requirements	To satisfy the requirement of the test	18 of IS 2860

Table 2 Limits for Heavy Metals in Mango Pulp/Puree

(Clause 5.7.1 and 8)

Sl No.	Characteristic	Requirement	Method of Test, Ref to Clause No. of IS 2860
(1)	(2)	(3)	(4)
(i)	Arsenic (as As), mg/kg, <i>Max</i>	0.2	13
(ii)	Copper (as Cu), mg/kg, <i>Max</i>	5.0	15
(iii)	Zinc (as Zn), mg/kg, <i>Max</i>	5.0	16
(iv)	Tin (as Sn), mg/kg, <i>Max</i>	250	17

Table 3 Microbiological Requirements for Mango Pulp/Puree

(Clause 5.7.2 and 8)

Sl No.	Characteristic			Requirement				Method of Test, Ref to IS or Clause No.
				Sampling Plan ¹⁾		Limit (cfu)		
				n	c	m	M	
(1)	(2)			(3)	(4)	(5)	(6)	(7)
(i)	Salmonella			5	0	Absent/25g	NA	5887 (Part 3)
(ii)	Listeria monocytogenes			5	0	Absent/25g	NA	14988 (Part 1)
(iii)	Sulphite Reducing Clostridia (SRC)			5	0	Absent/25g	NA	ISO 15213
(iv)	E. Coli 0157 and Vero or Shiga toxin producing E. coli			5	0	Absent/25g	NA	14397
(v)	Vibrio cholerae			5	0	Absent/25g	NA	5887 (Part 5)

Note: 1) For sampling plan see Annex B.

which the sealed container is capable of holding when completely filled.

5.8 Additional Requirements for ECO-Mark

5.8.1 General Requirements

5.8.1.1 The product shall conform to the requirements prescribed under **5.1** to **5.7**.

5.8.1.2 The manufacturers shall produce to BIS environmental consent clearance from the concerned State Pollution Control Board as per the norms laid down under the *Water (Prevention and Control of Pollution) Act, 1974*; *Air (Prevention and Control of Pollution) Act, 1981*; *Water (Prevention and Control of Pollution) Cess Act, 1977* respectively, along with the authorization, if required, under the *Environment (Protection) Act, 1986*, while applying for ECO-Mark.

5.8.1.3 The product/packaging may also display in brief the criteria based on which the product has been labeled environment friendly.

5.8.1.4 The material used for product/packing shall be recyclable or biodegradable.

5.8.1.5 The date of manufacture and date of expiry shall be declared on the product/package by the manufacturer.

5.8.1.6 The product shall be microbiologically safe and shall be free from bacterial and fungal toxins.

5.8.1.7 The product/package or leaflet accompanying it may display instructions of proper use, storage and transport (including refrigeration temperature compliance) so as to maximize the product performance, safety and minimize wastage.

6 PACKING AND MARKING

6.1 Packing

The material shall be packed in new cans, jars, canisters, bottles, aluminium containers and it shall be securely sealed. It can also be packed in aseptic and flexible packaging material having food grade quality conforming to the standards laid down by BIS.

6.2 Marking

6.2.1 Each container/package shall be marked or labelled with the following particulars:

- a) Name and grade of the material with the brand name, if any;
- b) Name and address of the manufacturer;
- c) Net weight of the contents of the can in grams;
- d) Date of manufacture or code number indicating the date of manufacture;
- e) Date of expiry;
- f) Manufacturing licence number; and
- g) Any other requirement as stipulated under *Food Safety and Standards Act, 2006* and Regulations framed thereunder and *Legal Metrology Act, 2009* and Rules framed thereunder.

6.2.2 BIS Certification Marking

The product may also be marked with the Standard Mark.

6.2.2.1 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the standard mark.

6.2.3 ECO-Mark

The product may also be marked with the ECO-Mark, the details of which may be obtained from the Bureau of Indian Standards.

7 SAMPLING

The method of drawing representative samples of the material and the criteria for conformity shall be as prescribed in of IS 2860.

8 TESTS

Tests shall be carried out as prescribed in relevant clauses specified Table 1, Table 2 and Table 3.

ANNEX A

(Clause 4 and 5.5.1.1)

DETERMINATION OF THE GRADE OF MANGO PULP/PUREE

A-1 APPARATUS

A-1.1 White Porcelain Bowls

of appropriate size to hold the contents of the can/ package under examination.

A-1.2 Stainless Steel Spoons

A-2 PROCEDURE

A-2.1 Panel of Judges

Grades of the product shall be judged by a panel of 3 to 5 judges. All the judges constituting a panel shall be conversant with the factors governing the quality of the product. The containers shall be opened and the contents poured separately into white porcelain bowls. Each judge shall independently examine the contents from each of the containers and assign scores for different characteristics.

A-2.1.1 The judges shall consider the following characteristics:

- Colour,
- Consistency,
- Taste and flavour, and
- Absence of defects.

A-2.2 System of Scoring

The variations within each factor are so described that the scores may be ascertained for each factor and expressed numerically. The relative importance of each factor has been expressed numerically on a scale of 100. Each judge shall give a score for the individual factors, by the method described in Table 4 and record his observations in the score sheet.

A-2.2.1 The scores as number of points given by the judges for the contents of each can for the 4 factors shall be recorded in a tabular form in the score card and the average score calculated for each factor with overall average for each can entered in the appropriate column (see Table 4 and **A-2.3.2**).

A-2.3 Ascertaining the Grade

A-2.3.1 Agreement among Judges

To ascertain uniformity of judgement among the judges, the total score assigned by each of them for the contents of the same can shall be calculated by adding up the scores for the various individual characteristics. If the difference between the maximum and the minimum of the total score so obtained does not exceed $(K + 5)$, where K is the number of judges, the scoring shall be deemed as uniform for the container under consideration. If the difference exceeds $(K + 5)$, the

Table 4 Method for Giving Scores to Mango Pulp/Puree

(Clause A-2.2.1)

SI No.	Characteristic	Requirement	Maximum Number of Points
(1)	(2)	(3)	(4)
i)	Colour	Good, practically uniform colour Reasonably good and uniform colour Fairly good colour; varying in shades	20 15 13
ii)	Consistency	Good consistency thick uniform Reasonably good consistency, reasonably uniform with a little tendency for separation Fairly good consistency, tendency for separation	20 15 13
iii)	Taste and flavour	Pleasant aroma and flavour characteristic of the products, free from objectionable or offtaste, smell or odour Pleasant aroma and flavour characteristic of the product; a very slight offensive smell, but product still acceptable Characteristic flavour, objectionable smell may be present, but to such extent as not to render the product unacceptable	40 30 26
iv)	Absence of defects	Practically free from defects, such as presence of peel or fibrous material and other extraneous materials Reasonably free from defects; some fibrous material may be present A few pieces of peel present	20 15 13

most outlying score, that is, the one which is farthest from its immediate neighbor (the scores being arranged in one order) shall be discarded and the uniformity among the remaining judges examined.

A-2.3.2 When the consistency (*see A-2.3.1*) is thus established the overall average scores given by the judges whose scoring has been found to be consistent shall be calculated for each container. The average score for each of the individual characteristic shall also be calculated by taking into account the corresponding scores and given by the same judge for the contents of the same can.

A-2.3.3 *Assignment of Grade*

In order to assign a grade for the contents of a can, the following procedure shall be adopted:

- a) Grade 1 — The score for each factor individually shall be not less than 75 percent of the maximum score obtainable and the overall average score shall be not less than 85 points.
- b) Grade 2 — The score for each factor individually shall be not less than 65 percent of the maximum score obtainable, and the overall average score shall be not less than 75 points.

ANNEX B

[Table 3]

SAMPLING PLAN FOR MICROBIOLOGICAL REQUIREMENTS**B-1 SAMPLING PLAN FOR MICROBIOLOGICAL REQUIREMENTS**

The terms n, c, m and M used in this standard have the following meaning:

n = Number of units comprising a sample;

c = Maximum allowable number of units having microbiological counts above m for 2-class

sampling plan and between m and M for 3-class sampling plan;

m = Microbiological limit that separates unsatisfactory from satisfactory in a 2-class sampling plan or acceptable from satisfactory in a 3-class sampling plan; and

M = Microbiological limit that separates unsatisfactory from satisfactory in a 3-class sampling plan.

B-2 INTERPRETATION OF RESULTS

2-Class Sampling Plan (where n, c and m are specified)	3-Class Sampling Plan (where n, c, m and M are specified)
<ol style="list-style-type: none"> 1. Satisfactory, if all the values observed are $\leq m$ 2. Unsatisfactory, if one or more of the values observed are $> m$ or more than c values are $> m$ 	<ol style="list-style-type: none"> 1. Satisfactory, if all the values observed are $\leq m$ 2. Acceptable, if a maximum of c values are between m and M and the rest of the values are observed as $\leq m$ 3. Unsatisfactory, if one or more of the values observed are $> M$ or more than c values are $> m$

ANNEX C

(Clause 5.7.3)

DETERMINATION OF WATER CAPACITY**C-1 GENERAL**

This method applies to metal, glass and rigid plastic containers.

C-2 PROCEDURE**C-2.1 Metal Containers**

C-2.1.1 Select a container which is undamaged in all respects.

C-2.1.2 Wash, dry and weigh the empty container after cutting out the lid without removing or altering the height of the double seam.

C-2.1.3 Fill the container with distilled water at 20°C to 4.8 mm vertical distance below the top level of the container, and weigh the container thus filled.

C-2.2 Glass Containers

C-2.2.1 Select a container which is undamaged in all respects.

C-2.2.2 Wash, dry and weigh the empty container.

C-2.2.3 Fill the container with distilled water at 20°C to the level of the top thereof, and weigh the container thus filled.

C-3 CALCULATION AND EXPRESSION OF RESULTS**C-3.1 Metal Containers**

Subtract the mass found in **C-2.1.2** from the mass found in **C-2.1.3**. The difference shall be considered to be the mass of water required to fill the container. Results are expressed as ml of water (V_0).

C-3.2 Glass Containers

Subtract the mass found in **C-2.2.2** from the mass found in **C-2.2.3**. The difference shall be considered to be the mass of water required to fill the container. Results are expressed as ml of water (V_0).

C-4 CALCULATION OF PERCENTAGE FILL

To determine the percentage fill in the container, empty the entire contents of the container in a graduated volumetric cylinder and note down the volume (V_1). The formula for the calculation is as follows:

$$\text{Percentage fill} = \frac{V_1}{V_0} \times 100$$

where,

V_0 = Water capacity of the container, and

V_1 = Volume of contents filled in the container.

SCORE SHEET FOR INDIVIDUAL JUDGE

Sample No.

Date of Sampling

DETAILS OF THE SAMPLE:

a) Product.....

b) Name of Manufacturer.....

c) Type.....

d) Batch No.

e) Date of Manufacture.....

FACTOR	SCORE POINTS	Sample Product									
		1	2	3	4	5	6	7	8	9	10
Colour	Grade 1 15–20										
	Grade 2 13–14										
Consistency	Grade 1 15–20										
	Grade 2 13–14										
Taste and Flavour	Grade 1 15–20										
	Grade 2 13–14										
Absence Of Defects	Grade 1 15–20										
	Grade 2 13–14										

Signature of the Judge

Date

SCORE CARD

Sample Number

Date of Sampling

DETAILS OF THE SAMPLE :

a) Product

b) Name of Manufacturer

c) Type

d) Batch No.

e) Date of Manufacture

FACTOR →	COLOUR					CONSISTENCY					TASTE AND FLAVOUR					ABSENCE OF DEFECTS					TOTAL SCORES					AVERAGE SCORE FOR					GRADE OF THE CAN
Judge → Sample Number ↓	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	Colour	Consistency	Taste and Flavour	Absence Of Defects	Total	

Remarks:

Signature

Date

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 2016* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc No.: FAD 10 (12574).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402

Website: www.bis.gov.in

Regional Offices:

Telephones

Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 2323 7617 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	{ 2337 8499, 2337 8561 2337 8626, 2337 9120
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg CHANDIGARH 160019	{ 265 0206 265 0290
Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600113	{ 2254 1216, 2254 1442 2254 2519, 2254 2315
Western	: Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400093	{ 2832 9295, 2832 7858 2832 7891, 2832 7892

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. COIMBATORE.
DEHRADUN. DURGAPUR. FARIDABAD. GHAZIABAD. GUWAHATI.
HYDERABAD. JAIPUR. JAMMU. JAMSHEDPUR. KOCHI. LUCKNOW.
NAGPUR. PARWANOO. PATNA. PUNE. RAIPUR. RAJKOT. VISAKHAPATNAM.

Published by BIS, New Delhi